

TS 1480 PCT

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C L A I M S

1. Process for the preparation hydrogen and a mixture of hydrogen and carbon monoxide containing gas from a carbonaceous feedstock by performing the following steps:
 - (a) preparing a mixture of hydrogen and carbon monoxide having a temperature of above 700 °C
 - (b) catalytic steam reforming a carbonaceous feedstock in a Convective Steam Reformer zone, wherein the required heat for the steam reforming reaction is provided by convective heat exchange between the steam reformer reactor zone and the effluent of step (a) to obtain as separate products a steam reforming product having a hydrogen to CO molar ratio of greater than 2 and a cooled effluent of step (a), and
 - (c) separating hydrogen from the steam reforming product.
2. Process according to claim 1, wherein the steam reforming product has a hydrogen to CO molar ratio of between 3 and 6.
- 20 3. Process according to any one of claims 1-2, wherein hydrogen is isolated by membrane separation, by a pressure swing absorber step or by a membrane separation followed by a pressure swing absorber step.
4. Process according to any one of claims 1-3, wherein part of the steam reforming product as obtained in step (b) is used in step (a) as feedstock of an autothermal reformer wherein said steam reformer product is partially oxidized with a source of oxygen.

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5. Process according to any one of claims 1-3, wherein step (a) is performed by means of a non-catalyzed partial oxidation of the carbonaceous feedstock and oxygen.
- 5 6. Process according to claim 5, wherein the remainder part of the steam reforming product and the cooled effluent of step (a) as obtained in step (b) is combined after having supplied heat to the steam reforming reactor zone in step (b).
- 10 7. Process according to claim 5, wherein the remainder part of the steam reforming product is fed to step (a).
8. Process according to claim 7, wherein the remainder part of the steam reforming product is fed to step (a) such that this stream is mixed with the effluent of the partial oxidation such that the temperature of the
- 15 15 effluent of the partial oxidation is reduced in temperature by between 250 and 500 °C.
9. Process according to claim 8, wherein the mixture having the reduced temperature is subjected to an catalytic post reformer step before it is used in
- 20 20 step (b) to provide the required heat for conducting the steam reforming reaction.
10. Process according to any one of claims 1-9, wherein the convective steam reformer zone comprises of a tubular reactor provided with one or more tubes containing a
- 25 25 reforming catalyst.
11. Process according to any one of claims 1-10, wherein the mixture of carbon monoxide and hydrogen as obtained is used as feedstock for a Fischer-Tropsch synthesis and that the hydrogen obtained in step (c) is used in a
- 30 30 hydroconversion process in which the Fischer-Tropsch

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derived paraffin feedstock is converted into a hydrogenated, hydroisomerised and/or catalytically dewaxed product.